REMARKS

Claims 1-3 are presently pending in the application.

Claims 1 and 2 have been amended to positively recite specific phosphorus compounds: a monoalkylphosphite, a dialkylphosphite, a trialkylphosphite, a monoalkylthiophosphite, a dialkylthiophosphite, a trialkylthiophosphite, and salts of phosphites and thiophosphites obtained by reacting phosphites and thiophosphites with ammonia or an amine compound having in its molecules only hydrocarbon groups of 1 to 8 carbon atoms or hydroxyl groups. Support for these amendments may be found in the specification at least in Examples 5-6 (particularly phosphorus additives 1 and 2 in Table 1) and at page 10, lines 3-11; page 12, line 1 to page 13, line 26, and at page 14, last 3 lines. Claims 1 and 2 have also been amended to recite a "dithiocarbamate compound," which is supported at least at page 22, line 5, and a calcium sulfonate, which is supported at least at pages 22-23. No new matter has been added by these amendments, and entry is respectfully requested.

In the Office Action, the Examiner has rejected claims 1-3 under 35 U.S.C. § 112, first paragraph, as failing to comply with the written description requirement. Specifically, the Examiner argues that claims 1 and 2 recite a phosphorus compound selected from the group consisting of phosphites and an ammonium or amine salt, and that these broadly recited compounds are not supported in the specification. Similarly, the Examiner argues that the non-molybdenum compound recited in claims 1 and 2 is not supported. Finally, the Examiner argues that the broad recitation in claims 1 and 2 of a sulfur-containing compound selected from the group consisting of thiazoles, thiadiazoles, etc., and an alkaline earth metal sulfonate is not supported in the specification. Applicants respectfully traverse this rejection as follows.

While not necessarily agreeing with the Examiner's arguments in support of the § 112 rejection, claims 1 and 2 have been amended to positively recite specific phosphorus compounds, described above. Support for these amendments may be found in the specification at least in Examples 5-6 (particularly phosphorus additives 1 and 2 in Table 1) and at page 10, lines 3-11; page 12, line 1 to page 13, line 26, and at page 14, last 3 lines. Further, the phrase "non-molybdenum-containing dithiocarbamate compound" has been replaced with "dithiocarbamate compound," which is supported in the specification at least at page 22, line 5. Finally, the phrase

"an alkaline earth metal sulfonate" has been changed to "a calcium sulfonate." Support for this amendment may be found in the specification at least at pages 22-23, which teach that additives may be included in the composition, including thiazoles as corrosion inhibitors and metallic detergents, such as calcium sulfonates, and that these additives may be used singly or in combination (page 23, lines 2-3, emphasis added). Also, the compositions in Examples 1-6 contain both a thiadiazole-based corrosion inhibitor and calcium sulfonate as a Ca-based detergent. Accordingly, reconsideration and withdrawal of the § 112 rejection are respectfully requested.

The Examiner has again rejected claims 1-3 under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,583,092 of Carrick et al. ("Carrick") in view of U.S. Patent Application Publication No. 2001/0044389 of Komiya et al. ("Komiya") and U.S. Patent No. 4,169,799 of Sung et al. ("Sung"). The Examiner maintains that Carrick discloses a lubricating oil composition comprising base oil, specifically mineral oil of the paraffinic and naphthenic type, and specific amounts of phosphorus and sulfur which allegedly overlap the claimed amounts. The Examiner contends that the phosphorus compound D-1 of Carrick has a central phosphorus atom, and thus overlaps the claimed phosphite, and further that the sulfur-containing compound may contain molybdenum dithiocarbamate or an alkylated diphenylsulfide or derivates thereof.

Carrick allegedly also discloses viscosity index improvers, including polymethacrylates, and a kinematic viscosity of the composition of 5 to 16.3 mm^2/s at 100° C. The Examiner acknowledges that Carrick does not teach the kinematic viscosity and %Cp of the mineral oil or the sulfonate detergent as an alkaline earth metal sulfonate. However, the Examiner argues that in view of the teaching of Carrick of the kinematic viscosity of the final composition and the fact that the composition comprises mineral oil and a viscosity index improver up to 10 wt%, a sufficient amount of viscosity index improver was added to the mineral oil to raise it to 5 mm^2/s at 100° C from the initial viscosity. Therefore, the Examiner concludes that it would have been obvious to one having ordinary skill in the art at the time of the invention for the initial kinematic viscosity of the mineral oil to also overlap that of the present claims.

The Examiner further maintains that Komiya discloses a lubricating composition containing mineral oils, such as paraffinic and naphthenic mineral oils which have a kinematic

viscosity of 1 to 4 mm^2/s as claimed. The Examiner takes the position that the transmission oils disclosed by Carrick and Komiya display the same characteristics and that it would have been obvious for the transmission oil composition disclosed by Carrick to comprise a base mineral oil having a %Cp from 75-81, as taught by Komiya, for enhancing low temperature fluidity.

Finally, the Examiner cites Sung as teaching that alkaline earth metal sulfonates are well known in the art as sulfonate detergents for use in lubricating compositions. Accordingly, the Examiner concludes that it would have been obvious to utilize an alkaline earth metal sulfonate as the sulfonate detergent in the Carrick composition. Applicants respectfully traverse this rejection for the reasons set forth previously on the record, which Applicants rely upon in full, and for the additional reasons which follow, and respectfully request reconsideration and withdrawal of the rejection.

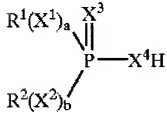
As previously explained on the record, the purpose of the presently claimed invention is to provide low viscosity transmission lubricating oil compositions which can enhance fuel efficiency and improve the durability of gears and the shifting properties of wet clutches, including long-lasting shifting properties. Applicants have developed the presently claimed low viscosity, low sulfur compositions that are obtained by adding appropriate amounts of (B) a specific phosphorus compound in an amount of 0.025 to 0.05 mass % or 0.03 to 0.035 % as P, (C) a viscosity index improver comprising a non-dispersion type polymethacrylate (PMA) having a number average molecular weight of from 5,000 to 35,000, (D) a sulfur-containing compound which is at least one compound selected from the group consisting of thiazole compounds, thiadiazole compounds, dithiocarbamate compounds, dihydrocarbylpolysulfide compounds and sulfurized ester compounds, as well as a calcium sulfonate, to (A) a specific mineral lubricating base oil having a kinematic viscosity of 2.3 to 3.4 mm^2/s or of 2.5 to 3.3 mm^2/s at 100°C and a %Cp of not less than 70 or of 73 to 82.

Carrick teaches a lubricating oil composition for engines containing: (A) a base oil, (B) an alkali or alkaline earth metal salt of a saligenin derivative, (C) an alkali or alkaline earth metal salt of a hydrocarbon-substituted salicylic acid, and (D) a metal salt of a phosphorus-containing compound. The composition of Carrick preferably also includes (E) an acylated nitrogen-containing compound, (F) a boron-containing compound, and (G) a dispersant viscosity index

modifier. Optional additives may be included, such as corrosion-inhibiting agents, antioxidants, viscosity modifiers, pour point depressants, etc. (col. 24, lines 63-67). Several of the claimed components are not taught or suggested by Carrick.

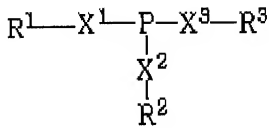
For example, Carrick teaches a metal salt of a phosphorus-containing compound represented by Formula (D-1) as an extreme pressure and/or antiwear additive, in which X1, X2, X3, and X4 are independently O or S; a and b are independently 0 or 1, and R1 and R2 are independently hydrocarbyl groups (col. 13, lines 15-35).

(D-I)



This Component (D-1) of Carrick is a phosphate metal salt and is completely different from claimed component (B), despite the Examiner's assertion that the compound of Carrick comprises a central phosphorus atom and therefore overlaps the claimed phosphite.

Phosphites and thiophosphites may be represented by the following formula:

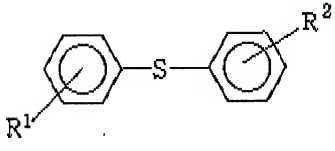


X^1, X^2, and X^3 are each independently oxygen or at least one of X^1, X^2, and X^3 is sulfur and the others are oxygen, provided that all of X^1 to X^3 are not sulfur, and at least one of R^1, R^2, and R^3 is a hydrocarbyl group and the others are hydrogen, provided that all of R^1, R^2, and R^3 are not

hydrocarbyl groups. It can be seen that phosphites and thiophosphites have no double bond as in the phosphorus-containing compound of Carrick. Although both (thio)phosphates (as taught by Carrick) and (thio)phosphites (as claimed) both have a central phosphorus atom, they clearly have very different structures. Therefore, Carrick does not teach or suggest claimed component (B).

Carrick also does not teach or suggest the use of the claimed sulfur-containing compound (D): a thiazole, thiadiazole, dithiocarbamate, dihydrocarbyl polysulfide compound, or sulfurized ester compound. The Examiner argues that the sulfur-containing compound of Carrick may be a molybdenum dithiocarbamate (col. 25, lines 15-27) or an alkylated diphenyl sulfide, derivative or analog (col. 5, lines 1-2). However, as previously explained on the record, molybdenum dithiocarbamate (MoDTC) compounds and dithiocarbamate compounds (DTC) basically belong to different categories of compounds. That is, MoDTC compounds are typically classified as "organic molybdenum compounds" and DTC compounds are typically classified as "organic sulfur compounds" but not as "organic molybdenum compounds." Thus, Carrick does not teach or suggest the claimed DTC.

Finally, dihydrocarbylpolysulfides as claimed may be generally represented by the formula R1-$[S]_n$-R2, wherein R1 and R2 are each independently a hydrocarbyl group and n is an integer of 2 or more. In contrast, an alkylated diphenylsulfide (as taught by Carrick) may be represented by the formula:



in which R1 and R2 are each independently an alkyl group. This compound and its derivatives have no S-S (disulfide) bond and thus are completely different in structure from the claimed

as also described in Carrick, the alkylated diphenyl sulfide is a base oil but not an additive. Therefore, Carrick does not teach or suggest dihydrocarbylpolysulfides as claimed.

Accordingly, Carrick does not teach or suggest claimed sulfur-containing compound (D) and thus does not teach or suggest at least Components (B) and (D). Further, even modification of the Carrick composition to include the mineral oil of Komiya and the alkaline earth metal sulfonate of Sung, as suggested by the Examiner, would still not result in a composition containing components (B) and (D) as claimed. Accordingly, even the proposed combination of references would not teach or suggest all of the claimed elements, and reconsideration and withdrawal of the § 103(a) rejection based on Carrick in view of Komiya and Sung are respectfully requested.

In view of the preceding Amendment and Remarks, it is respectfully submitted that the pending claims are patentably distinct from the prior art of record and in condition for allowance. A Notice of Allowance is respectfully requested.

Respectfully submitted,

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Petition for Extension of Time (one-month)